

## WHAT IS CLAIMED IS:

1. A process for making a lube base stock comprising:
  - a) contacting an olefinic feedstock, with boiling points greater than 180 F, with an oligomerization catalyst in a catalytic distillation unit to produce a product with a higher number average molecular weight than the olefinic feedstock; and
  - b) separating said product in said catalytic distillation unit into a light by-product fraction and a heavy product fraction, wherein said heavy product fraction comprises hydrocarbons in the lube base stock range.
2. The process of Claim 1, wherein at least a portion of the olefinic feedstock is derived from Fischer-Tropsch synthesis.
3. The process of Claim 1, wherein said olefinic feedstock has boiling points greater than 258 F.
4. The process of Claim 3, wherein said olefinic feedstock has boiling points within the range of from 258 to 1100 F.
5. The process of Claim 4, wherein said olefinic feedstock has boiling points within the range of from 258 to 650 F.
6. The process of Claim 1, wherein the oligomerization catalyst comprises an acidic ionic liquid.
7. The process of Claim 6, wherein the acidic ionic liquid catalyst is withdrawn continuously from the catalytic distillation unit, continuously regenerated outside the catalytic distillation unit, and then continuously reintroduced to the catalytic zone at the same rate as withdrawal.
8. The process of Claim 1, wherein said oligomerization catalyst comprises an inorganic oxide support.
9. The process of Claim 8, wherein said oligomerization catalyst comprises a Group VIII metal on an inorganic oxide support.
10. The process of Claim 9, wherein said inorganic oxide support is a zeolitic support.

11. The process of Claim 10, wherein said oligomerization catalyst is nickel on ZSM-5.
12. The process of Claim 1, wherein unreacted olefinic feedstock is refluxed over said oligomerization catalyst within said catalytic distillation unit.
13. The process of Claim 1, wherein excess nonolefinic portions of the feedstock are continuously removed from the oligomerization zone.
14. The process of Claim 12, whereby the light fraction is continuously sent to an olefin forming reactor and the resulting olefinic fraction is returned as olefinic feed to the catalytic distillation unit
15. The process of Claim 1, further comprising hydrofinishing the heavy product.
16. The process of Claim 1, wherein said heavy products has a viscosity of greater than 2 cSt at 100 C, and a viscosity index of at least 80, and a pour point of less than -10 C.
17. The process of Claim 1, wherein said heavy product fraction has a viscosity of greater than 2 cSt at 100 C, a viscosity index of at least 120, and a pour point of less than -20 C.
18. The process of Claim 1, wherein said heavy product fraction is separated into at least one of the following fractions:
  - a) a light lube base stock fraction having a viscosity of from 2 to 7 cSt at 100 C;
  - b) a heavy lube base stock fraction having a viscosity of from 6 to 20 cSt at 100 C; and
  - c) a bright stock fraction having a viscosity of greater 180 cSt at 40 C.
19. The process of Claim 1 wherein, said heavy product fraction is predominately a bright stock fraction having a viscosity of greater than 180 cSt at 40 C.
20. A process for making a lube base stock comprising:
  - a) obtaining a diolefin-containing olefinic feedstock with boiling points within the range of from 258 to 650 F and including between 10% and 50% olefins;

- b) selectively hydrogenating the diolefin-containing olefinic feedstock to saturate at least a portion of any diolefins present while not saturating most of the mono-olefins present;
  - c) contacting said selectively hydrogenated olefinic feedstock with an oligomerization catalyst in a catalytic distillation unit to produce a product having a number average molecular weight at least 20% higher than the olefinic feedstock;
  - d) separating said product in said catalytic distillation unit into a light byproduct fraction and a heavy product fraction, wherein said heavy product fraction comprises hydrocarbons in the lube base stock range with a viscosity of greater than 2 cSt at 100 C, a viscosity index of above 80 and a pour point of less than -10 C;
  - e) withdrawing nonolefinic portions of feedstock from the oligomerization zone; and
  - f) hydrofinishing said heavy product fraction.
21. A hydrocarbon in the lube base oil range produced by a process comprising:
- a) contacting an olefinic feedstock with boiling points greater than 180 F with an oligomerization catalyst in a catalytic distillation unit to produce a product having a higher number average molecular weight than the olefinic feedstock; and
  - b) separating said product in said catalytic distillation unit into a light byproduct fraction and a heavy product fraction, wherein said heavy product fraction comprises hydrocarbons in the lube base stock range.